This is a sample of the typical survey scope required to support engineering design for a City of Las Vegas capital improvement project. Surveys performed for any particular project should adhere **ONLY to the specific language included within that project's contract documents.*

ARTICLE 100: 30% DESIGN PHASE

100.1 Survey

100.1.1 Horizontal Control. The official horizontal coordinate system of the City of Las Vegas is the Nevada Coordinate Reference System (NCRS). The appropriate NCRS zone is dependent on the geographic location of the project and should be determined prior to any surveying activities. The official geodetic datum and current reference frame of the City of Las Vegas is NAD 83 (2011) epoch 2010.0. The use of any other reference frame will require approval of the City Surveyor. For detailed information on the NCRS contact the City of Las Vegas' Survey Section.

100.1.2 Vertical Control. All vertical control is to be established using benchmarks included in the City of Las Vegas Vertical Control Network. The official datum of the City of Las Vegas is NAVD 88. Only elevation values currently published as the "City of Las Vegas 2008 Adjustment" are to be used. The use of a prior Vertical Control Network adjustment will require approval of the City Surveyor.

100.1.3 Control Survey. Perform control survey to establish adequate control for all boundary location and topographic mapping necessary for the limits and purpose of the project. Existing monuments within the project limits and control panels set for the purpose of aerial mapping will be incorporated into the control survey.

100.1.4 Boundary Survey. Boundary surveys are to be performed to adequately establish roadway alignments, right-of-way lines, property lines and easement lines necessary for the limits and purpose of the project. Complete research of existing recorded maps, surveys, land records, and other pertinent records shall be performed.

100.1.5 Record of Survey. The Consultant shall provide a Record of Survey to be reviewed by the City of Las Vegas' City Surveyor. The Record of Survey will show all pertinent information from the control and boundary surveys so as to show the project's location relative to existing roadway alignments, right-of-way lines and found survey monuments. The City Surveyor must approve the Record of Survey prior to recordation with the Clark County Recorder. **The City will not accept the 30% design submittal unless the Record of Survey is formally submitted and approved in writing by the City Surveyor.**

100.1.5.1 Deliverables. The Consultant shall submit three (3) copies of the Record of Survey to the City. Consultant shall record the "approved" Record of Survey with the Clark County Recorder.

100.1.6 Survey Control Plan. A Survey Control Plan shall be included in the plan set to show all elements included in the Record of Survey. An "embedded" Record of Survey is acceptable. All Survey Control Plans must be stamped by a Nevada licensed Professional Land Surveyor (PLS) per NAC 625. A separate Horizontal Control Plan showing proposed project geometry may be utilized in the plan set stamped by a Nevada licensed Professional Engineer (PE) per NAC 625.

100.1.7 Survey Monument Inventory. All survey monuments within or adjacent to the limits of proposed construction activities shall be clearly identified on the plan and profile sheets (or demolition/removal sheets when applicable), to aid in the preservation and replacement of survey monuments during construction. Survey monumentation displaced, disturbed, and/or missing within the project limits shall be identified for replacement as a part of the Project Contract Documents in accordance with the City of Las Vegas Unified Development Code.

100.1.8 Design Topographic Survey. Aerial surveys and conventional field surveys of all surface features within the project limits will be used to develop engineering base drawings and digital terrain models (DTM). Survey limits shall extend a minimum of 150 feet in each direction past the curb returns at all major cross streets, 100 feet at minor cross streets. Aerial mapping specifications are to include a minimum mapping scale of one inch equals forty feet and a minimum contour interval of one foot. Consultant shall perform adequate conventional field surveying to verify aerial survey accuracy. Consultant shall compile 2D planimetrics of all topographic features within project limits utilizing all applicable aerial and conventional field survey data within project limits. Consultant shall produce an existing ground DTM (in a Civil 3D Surface format) utilizing all applicable aerial and conventional field survey data within project limits.

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Consultant shall perform field inspection of aerial survey data to ensure inclusion and proper identification of surface features, as well as confirming data reflects current conditions. In the event that aerial survey data is insufficient in particular areas to complete design topographic survey tasks as listed above, the consultant shall conduct supplemental conventional field survey and update the surface where necessary.

100.1.8.1 Topographic Features. The following surface features within the project limits are to be included (but not limited to): curb, gutter, sidewalk, edge of pavement, driveways, handicap ramps, parking, walls, fences, buildings, vegetation, signs, traffic markings, manholes, vaults, pullboxes, pedestals, utility poles, overhead lines, catch basins and other surface indications of subsurface utilities. Sewer manholes, storm drain manholes, catch basins and water valves are to be measured at and below the surface. Appropriate survey methods are to be used to obtain elevations of sewer and drainage improvements.

NOTE TO SCOPE WRITER: DETERMINE IN CONSULTATION WITH CLV SURVEY IF POINT CLOUD DATA IS AVAILABLE, AND IF SO, USE THE ALTERNATE PARAGRAPHS BELOW FOR 102.1.8 AND 102.1.8.1

Design Topographic Survey. Lidar point cloud data extraction and conventional field surveys of all surface features within the project limits will be used to develop engineering base drawings and digital terrain models (DTM). Survey limits shall extend a minimum of 150 feet in each direction past the curb returns at all major cross streets, 100 feet at minor cross streets. Lidar point clouds shall be provided to the consultant by the City's Representative. Consultant shall compile 2D planimetrics of all topographic features within project limits consistent with traditional survey deliverables. Consultant shall produce an existing ground DTM (in a Civil 3D Surface format) with relative accuracy to Lidar point cloud data of ±0.05' within project limits. Consultant shall perform field inspection of Lidar point cloud data to ensure inclusion and proper identification of surface features, as well as confirming data reflects current conditions. In the event that Lidar point cloud data is insufficient in particular areas to complete design topographic survey tasks as listed above, the consultant shall conduct supplemental conventional field survey where necessary and when approved.

Topographic Features. The following surface features within the project limits are to be included (but not limited to): curb, gutter, sidewalk, edge of pavement, driveways, handicap ramps, parking, walls, fences, buildings, vegetation, signs, traffic markings, manholes, vaults, pullboxes, pedestals, utility poles, overhead lines, catch basins and other surface indications of subsurface utilities. Sewer manholes, storm drain manholes, catch basins and water valves are to be measured at and below the surface. Appropriate survey methods are to be used to obtain elevations of sewer and drainage improvements.

100.1.8.2 The Consultant will coordinate any required private property access with the City's Representative.